etcetera) in a coordinated effort requires an entirely new hand-eye-coordination skill set. Therefore a need exists for a mouse alternative that does not require a new hand-eye-coordination skill set.

The second major problem in the industry is related to accidental sensor activation (accidental data entry). Most computer mouse alternatives are prone to accidental sensor activation in one way or another. This includes accidental sensor activation caused by movements of the human hand, and accidental sensor activation caused by touching or holding things with the human hand. For example, virtual reality type gloves detect hand motions, and will move the mouse cursor and enter commands by any movement of the hands, fingers, or wrist. This is a particular issue when moving the wrist and fingers to type on a keyboard. Other alternatives locate the sensors on parts of the hand that subject them to accidental activation when holding a glass, writing with a pen, typing on a keyboard, or performing other standard operations. Still other solutions separate the mouse cursor movement function from the mouse "click" function to such an extreme that once the desired cursor position is obtained, the user must then reposition the hand (and hence loose the desired cursor position) in order to activate the mouse "click" feature. Therefore the use of such devices brings practical computer operation to a standstill. Here too a need exists for a mouse alternative that avoids accidental sensor activation.

The third major problem in the industry is related to the tactile and gripping ability of the human hand. As will be seen, many virtual reality glove type devices cover the finger-pads of the human hand. In other words; devices that locate sensors in the fingertip area also cover the finger-pads. In doing so the user is left without the tactile touch senses and gripping surfaces of the fingertips. This is particularly important when considering the registration "bumps" on the "F", "J", and "5" keys of a computer keyboard. Therefore a need exists for a mouse alternative that leaves the finger-pads exposed when locating sensors in the fingertip area.

For example, U.S.Pat. No. 4,414,537 (Grimes)....."

Page 5, line 3, change "....the confines of a single hand." TO:

"....the confines of a single hand. This leads to the ultimate shortcoming of the device. This shortcoming is due to the fact that once the user locates the ring for desired cursor position; the user must then move the hand (ring) back to the keyboard "click" button in order to activate the mouse command. In doing so, the user looses the desired cursor position. Therefore the user is unable to simultaneously position the curser and click the keyboard mouse button with a single hand. Hence the device is unable to function as a computer mouse replacement. Additionally, the user's hand must never leave the proximity of the receivers in the computer keyboard as this would render the device unusable. Therefore the user is always

tethered to the computer keyboard. Lastly, the cursor will be moving across the screen in an uncontrolled manner as the user types on the keyboard. This will be an obvious annoyance the user.

Pub. No.: US 2004/0012564 A1 (Zngf, et al), describes a virtual reality glove type device that has a tilt sensor mounted on the back of the hand, and bending sensors mounted on each finger of the glove. As the user rotates their wrist between 0-180 degrees, the tilt sensor changes the corresponding roll-angle of the on-screen cursor. Once the desired angle of travel is obtained, the user then moves the thumb toward the index finger in order to move the cursor from left-to-right along the angular line of travel. Likewise the user moves the index finger toward the thumb to move the cursor from right-to-left along the line of travel. Once the cursor is at the desired location, the user then activates the mouse "click" button by bending either the middle, ring, or little finger. Although unique, this device has several limitations as follows:

a) The device requires the user to learn a whole new hand-eye-coordination skill set. This is due to the fact that cursor movement is obtained from three different sensors instead of just one. Hence, three different body elements (wrist, thumb, index-finger) are required to move the cursor instead of just one body element. This puts the invention at a disadvantage when compared to devices that obtain cursor movement from a single sensor.
b) The device cannot be used when performing any other function such as typing on the keyboard. This is due to the fact that as the user types (or performs other functions), the mouse cursor will be moving across the computer screen in an uncontrolled manner. Adding simultaneous "mouse-click" activation from the middle, ring, and little finger will bring complete mayhem to the computer environment.
c) The cost and labor to manufacture a device that requires three sensors for cursor movement is more costly than a device that only requires one sensor.
d) The device is not designed for universal right or left hand operation. This is due to the fact that when the device is moved from the right hand to the left, all of the sensors will function in the opposite direction. This would be a particular problem for ambidextrous users. This problem would require expensive bi-directional sensors, and/or a separate device program for left handed users. Additionally, using the device on the left hand places the sensors on the wrong side of the glove. This may interfere with other work functions.
e) The device fails to utilize a convenient means to turn the unit on or off.
f) The glove type device cannot be quickly and conveniently attached or removed. This makes it more difficult to wash hands, shake hands, use the bathroom, or perform other hygiene functions.
g) The device would require periodic sterilizing and cleaning similar to that of an article of clothing. This would be especially necessary in the event that multiple operators were sharing the same device.
h) The device requires the user to rotate the wrist between 0-180 degrees. This is a difficult task to perform and could eventually lead to a repetitive-stress injury.

i) The device fails to utilize wireless communications whereby the user would not be tethered to the computer.

j) The device requires the use of all the fingers of the human hand, and therefore cannot be used by handicapped persons who are missing one or more fingers.

U.S. Pat. No. 6,049,327 (Walker, et al), describes a virtual reality glove type device that is used to control computer animations. The glove contains a hand shaped circuit board that is placed on the backside of the hand. This flexible circuit board has a special characteristic in that it can detect flexation. In doing so the device can detect finger and thumb movements. Hand gestures are thereby converted to computer commands for controlling computer-based animations. Although a unique invention, the device is not well suited for mouse equivalent computer commands. This is due to the fact that the unit fails to include a mouse "click" button. Additionally, the device cannot be used when performing other functions such as typing on the keyboard. This is due to the fact that as the user types, the mouse cursor will be moving across the computer screen in an uncontrolled manner.

U.S. Pat. No. 5,999,166 (Rangan), describes a three-dimensional positioning device that utilizes optical electronics. The device consists of a tabletop enclosure that has a light source and a light detector. The user wears a ring type reflector that positions a small mirror on the underside of the hand. Light is then shone upward from the tabletop unit to the mirrored reflector under the hand. The user then moves the hand (reflector) over the device to reflect the light source to specific locations on the light detector. Reflecting light on different areas of the light detector results in a corresponding two-dimensional mapping, or cursor positioning, on the computer screen. Third-dimensional command data (if needed) is obtained by raising the reflector and hence lowering the intensity of reflected light on the light detector. Once the cursor is in the desired location, the user then depresses one of the buttons located on the front (finger) side of the tabletop unit. Although an interesting invention, the device would be difficult to use in place of a computer mouse. This shortcoming is due to the fact that once the user locates the reflector ring for desired cursor position; the user must then move the hand (ring) back to a location where the buttons can be depressed. In doing so, the user looses the desired cursor position. This problem is further magnified when the reflective ring is worn on the same finger that will be moving downward to depress the mouse button. Therefore the user is unable to simultaneously position the curser and click the mouse button. Hence the device does not function as a computer mouse replacement. Additionally, the user's hand must never leave the proximity of the tabletop unit, as this would render the device unusable. Therefore the user is always tethered to the computer desk. "

Page 8, lines 17-21, change " The electronics ....built into the computer." TO " The electronics interface required for the invention may be "wired" or "wireless", and may reside inside a separate enclosure, or reside in the same enclosure as the sensors. For a "wired" mouse, the electronics enclosure typically

resides next to the computer. For a "wireless" mouse, the electronics interface (transmitter) may be packaged with the sensors, or in a separate enclosure on the user's wrist, or other part of the body. The "wireless" receiver would typically reside next to the computer, or could even be built into the computer."

Page 9 – line 13, through page 10 – line 4, change "**Drawing Figures** FIGs. 10A & 10B..... ....Figs. 10A through Fig. 30 depict specific..... " TO:

" **Brief Description Of The Drawings**

FIGs. 1A & 1B are a "wired" illustration of a basic form of the invention utilizing a single mouse-stick, and a single button.

FIGs. 2A & 2B are a "wired" illustration of the invention utilizing a single mouse-stick, a single button, a horizontal navigation scroll wheel, and a vertical navigation scroll wheel.

FIGs. 3A & 3B are a "wireless" illustration of the invention utilizing a first mouse-stick, a second mouse-stick in place of scroll wheels, a single button, and retractable sensors.

FIGs. 3C & 3D are a "wireless" illustration of the invention utilizing a first mouse-stick, a second mouse-stick in place of scroll wheels, a single button, and retractable sensors of which are shown retracted.

FIGs. 4A & 4B are a "wireless" illustration of the invention utilizing a first mouse-stick, a second mouse-stick mounted on the dorsal fingertip, two buttons, and retractable sensors.

FIGs. 4C & 4D are a "wireless" illustration of the invention utilizing a first mouse-stick, a second mouse-stick mounted on the dorsal fingertip, two buttons, and retractable sensors of which are shown retracted.

FIGs. 5A & 5B are a "wireless" illustration of the invention utilizing a mouse-stick, two mouse buttons, a laser pointer, and a laser activation button.

FIGs. 6A & 6B are a universal right or left hand, and universal thumb or finger illustration of the invention.

FIGs. 7A & 7B are a "wireless" illustration of the invention utilizing sensors mounted on multiple fingers and multiple finger digits.

FIG. 8A is an illustration of the invention being used with an ordinary drinking glass.

FIG. 8B is an illustration of the invention being used with an ordinary writing pen.

FIG. 8C is an illustration of the invention being used with an ordinary computer keyboard.

FIG. 9 is an illustration of the invention being used as a video game controller.

FIG. 10 is a schematic illustration of a typical "wired" embodiment of the invention.

FIG. 11 is a schematic illustration of a typical "wireless" embodiment of the invention.

FIG. 12 is a schematic illustration of a typical embodiment of the invention being used with a video game.

Description - Figs. 1A through Fig. 12.

Figs. 1A through Fig. 12 depict specific..... "

Page 10, line 14, change " Now referring to Figs. 10A and 10B; these figures..... " TO " Now referring to Figs. 1A and 1B; these figures..... "

Page 11, line 3, change "..... the computer 20. Also notice....." TO "....the computer 20. It is also understood that the electronics interface can have either a "wired" or "wireless" connection to the computer. Also notice....."

Page 11, line 15, change " Now referring to Figs. 12A and 12B; these figures..... " TO " Now referring to Figs. 2A and 2B; these figures..... "

Page 11, line 34, change " Now referring to Figs. 14A, 14B, 14C, and 14D; these..... " TO " Now referring to Figs. 3A, 3B, 3C, and 3D; these..... "

Page 12, line 16, change " (The base knuckle is defined in Fig. 14B.) " TO " (The base knuckle is defined in Fig. 3B.) "

Page 12, line 21, change " .....assembly 46 as shown in Figs. 14C and 14D. " TO " .....assembly 46 as shown in Figs. 3C and 3D. "

Page 12, line 28, change " Now referring to Figs. 16A, 16B, 16C, and 16D; these..... " TO " Now referring to Figs. 4A, 4B, 4C, and 4D; these..... "

Page 12, line 34, change " The finger pad is defined in Fig. 16A as.... " TO " The finger pad is defined in Fig. 4A as.... "

Page 13, line 24, change " ....Figs. 16C and 16D. " TO " ....Figs. 4C and 4D. "

Page 14, lines 2-4, change " ..... hand. Now referring to Figs. 18A and 18B; these figures.... " TO:

" ....hand.

Now referring to Figs. 5A, and 5B; these figures represent a wireless embodiment of the invention that is well suited for overhead computer presentations. In this embodiment a sensor assembly 71 is mounted on the first digit of the index finger. Sensor assembly 71 consists of a sensor bus 73. Mounted on the thumb side of sensor bus 73 are a dual function mouse stick 75, a first mouse button 77, a second mouse

button 79, and a laser pointer activation button 81. Mounted on the top or dorsal side of sensor bus 73 is a laser pointer 83. Notice that sensor bus 73 is ergonomically shaped so that movements of the finger joints are not inhibited. Sensor bus 73 would normally be lined inside with expandable non-slip foam or similar product (not shown), or a hook and loop fastening strap (also not shown). This would allow sensor bus 73 to conform to a wide range of finger sizes without twisting and slipping on the finger. The user manipulates sensors 75, 77, 79, and 81 with the opposing thumb. This is accomplished by using the thumb tip, or the side of the thumb as may be appropriate. Note that laser pointer 83 only generates a laser output 85 when the laser pointer button 81 is activated. Sensory output is presented to the electronics interface (wireless transmitter & battery that are not shown) that are internal to sensor assembly 71. Notice the larger sensor bus 73 for enclosing the electronics interface (wireless transmitter and or receiver), and the battery. The electronics interface then transmits the sensor signals to a receiver 87. Receiver 87 then converts the sensory information to mouse equivalent data. This mouse equivalent data is then provided to a computer 20. (Computer input devices that include laser pointers are currently used in the art for overhead computer presentations. These are handheld devices that are shaped like a television remote control.) Buttons 77, 79, and 81 would typically be configured by the user either as a click button, an on / off button, a laser pointer button, a presentation "page forward" or "page reverse" button, or even a mode button that will switch the unit between different operational modes. This embodiment can be used to generate all forms of mouse equivalent data. This includes but is not limited to the "double-click" function, the "drag-and-drop" function, and etcetera. Although this embodiment describes the receiver assembly 87 as a separate enclosure, it is understood that it can also be incorporated within computer 20. Naturally this embodiment can be made without laser pointer 83.

Now referring to Figs. 6A and 6B; these.... "

Page 15, line 6, change " Now referring to Figs. 20A and 20B; these..... " TO " Now referring to Figs. 7A and 7B; these..... "

Page 16, lines 8-26, change " Now referring to Figs. 22A, 22B and 22C; these.... .... Now referring to Fig. 24. This embodiment....." TO:

"Now referring to Figs. 8A, 8B and 8C; these figures demonstrate how the invention can be utilized by the user without interfering with other standard procedures. These figures will incorporate sensor assemblies from previously discussed embodiments. Here in Fig. 8A we see the sensor assembly 36 from Fig. 3A, sensor assembly 58 from Fig. 4A, and sensor assembly 87 from Fig. 6A being used with an ordinary drinking glass 148. Notice that the user retains finger flexibility as needed to hold glass 148 without accidentally activating any sensors. Now referring to Fig. 8B we see the sensor assembly 36 from Fig. 3A, sensor assembly 58 from Fig. 4A, and sensor assembly 87 from Fig. 6A being used with an